What is claimed is:

1. An apparatus for the disposal of waste and/or hazardous materials, comprising:

a refractory-lined reactor vessel;

plasma-generating means within said refractory-lined reactor vessel for producing a high temperature plasma processing zone which has a substantially-uniform high temperature across the entire periphery of said refractory-lined reactor vessel, said plasma-generating means comprising at least one fixed-position plasma arc generator, and at least one movable plasma arc generator;

first feeding means for feeding said waste and/or hazardous materials to, and through, said high temperature plasma processing zone;

second feeding means for feeding sufficient process additive agents to said high temperature plasma processing zone to cause the substantially-complete decomposition of said waste and/or hazardous materials and conversion into stable non-hazardous materials;

controlling means for controlling said plasma generating means and the flow of said waste and/or hazardous materials through said high temperature plasma processing zone to ensure that all said waste and/or hazardous material reaches a sufficiently high temperature, for a sufficient period of time thermally to decompose said waste and/or hazardous materials and convert them into said stable non-hazardous final products;

gas removal means for removing product gas from said refractory lined reactor vessel with a gas exit velocity conducive to gasborne solids to fall back into the reactor vessel as opposed to being carried out of the reactor vessel with the exiting gas;

monitoring means for monitoring said product gas to determine the amount of particulate matter in said product gas and regulate said gas exit velocity; and

slag removing means for removing stable non-hazardous slag from said apparatus.

2. The apparatus as claimed in claim 1, wherein said at least one fixed position plasma arc generator comprises a pair of fixed-position plasma arc generators which are disposed within said refractory-lined reactor vessel from opposite sides thereof with angular displacement relative to each other so as to cause their plasma arc plumes to

intersect at a focal point which is near the center of said waste and/or hazardous material input.

3. The apparatus as claimed in claim 1, wherein said at least one movable plasma arc generator comprises a single movable plasma arc generator which is mounted at the top of said refractory-lined reactor vessel and possesses three degrees of freedom to permit aiming towards said focal point created by the intersection of plasma arc plumes from the fixed-position plasma arc generators and towards the slag pool at or near a slag exit port.

4. The apparatus as claimed in claim 1, wherein said at least one fixed-position plasma arc generator comprises a pair of fixed-position plasma arc generators which are disposed within said refractory-lined reactor vessel from opposite sides thereof with angular displacement relative to each other so as to cause their plasma arc plumes to intersect at a focal point which is near the center of the waste and/or hazardous material input, and further wherein said at least one movable plasma arc generator comprises a single movable plasma arc generator which is mounted at the top of said refractory-lined reactor vessel and possesses three degrees of freedom to permit aiming towards said focal point created by the intersection of plasma arc plumes from the fixed-position plasma arc generators and towards the slag pool at or near a slag exit port.

5. The apparatus as claimed in claim 1, wherein said first feeding means comprises a plurality of waste and/or hazardous material feed ports, each of which is configured to feed directly towards said focal point.

6. The apparatus as claimed in claim 1, wherein said gas removal means and said solids removal means are outlet ports which are diametrically opposite to said first feeding means.

7. The apparatus as claimed in claim 1, wherein said at least one movable plasma arc generator comprises a single movable plasma arc generator which is mounted at the top of said refractory-lined reactor vessel and possesses three degrees of freedom to

permit aiming towards said focal point and towards slag pool, wherein said gas removal means and said solids removal means are outlet ports which are diametrically opposite to said first feeding means, and further wherein said movable plasma arc generator is disposed in close proximity to said ports.

8. The apparatus as claimed in claim 1, including at least one port for the injection of steam towards said focal point.

9. The apparatus as claimed in claim 1, wherein said feeding means comprises a plurality of air process additive inlet ports disposed in spaced-apart relation around said refractory-lined reactor vessel.

10. The apparatus as claimed in claim 1, wherein said gas removal means comprises a gas exit port which is configured for an exit velocity of said gas conducive for gasborne solids to fall back into the reactor vessel rather than be carried out of the reactor vessel by the exiting gas stream.

11. The apparatus as claimed in claim 1, wherein a lower section of said refractory-lined reactor vessel is flanged to facilitate removal of said lower section.

12. The apparatus as claimed in claim 1, wherein said refractory lining comprises materials similar to ceramic blanket, insulating firebrick, and high alumina hot face brick, optionally containing small amounts of chromium oxide, zirconium oxide or magnesium oxide.

13. The apparatus as claimed in claim 1, wherein a lower section of said refractory-lined reactor vessel consists of a hot face refractory, said hot face refractory comprising materials similar to DIDIER DIDOFLO 89CR(™), and RADEX COMPAC-FLO V253(™).

14. The apparatus as claimed in claim 1, including water cooling means for a lower section of said refractory-lined reactor vessel.

15. The apparatus as claimed in claim 1, wherein said monitoring means includes sensors which are configured to determine the opacity of said exit gas stream.

16. The apparatus as claimed in claim 1, wherein said sensors are maintained essentially-deposit free by nitrogen purge element configured to provide a flow of nitrogen across the face of said sensors.

17. The apparatus as claimed in claim 1, wherein said sensors are maintained essentially-deposit free by elements for maintaining a negative pressure in the region of said sensors.

18. The apparatus as claimed in claim 1, also including a removable preheat burner within said refractory-lined reactor vessel.

19. The apparatus as claimed in claim 1, wherein said refractory-lined reactor vessel is cylindrical.

20. A method for the disposal of waste and/or hazardous materials, comprising:

providing a refractory-lined cylindrical reactor vessel with plasma-generating means within said refractory-lined reactor vessel and producing a high temperature plasma processing zone therein which has a substantially-uniform high temperature processing zone across the entire periphery of said refractory-lined reactor vessel, by using plasma-generating means comprising at least one fixed-position plasma arc generator, and at least one movable plasma arc generator;

feeding solid and/or liquid said waste and/or hazardous materials to, and through, said high temperature plasma processing zone;

selectively feeding sufficient process additive agents to said high temperature plasma processing zone, for completely decomposing said waste and/or hazardous materials and converting them into stable, non-hazardous gases and slag materials;

removing gaseous products from said high temperature plasma zone;

monitoring said gaseous products to determine the amount of particulate material in said gaseous products;

removing stable non-hazardous final slag product from said refractory-lined reactor vessel; and

injecting steam as process additive agent at a product gas exit.

21. The method as claimed in claim 20, which comprises disposing said movable plasma arc generators in close proximity to ports for continuously feeding said waste and/or hazardous materials to, and through, said high temperature plasma processing zone.

22. The method as claimed in claim 20, which further includes injecting steam process additive towards said high temperature plasma processing zone.

23. The method as claimed in claim 20, which comprises disposing process additive ports in spaced-apart relation around said refractory lined cylindrical reactor vessel and selectively feeding said process additive agents into said high temperature plasma processing zone through said process additive ports.

24. The method as claimed in claim 20, which comprises regulating gas exit velocity to be conducive for airborne solids to fall back into the reactor vessel as opposed to being carried out of the reactor vessel with exiting gas.

25. The method of claim 20, which includes cooling a lower section of said refractory-lined cylindrical reactor vessel.

26. The method as claimed in claim 20, wherein said monitoring comprises determining the opacity of said gaseous products by opacity sensors.

27. The method as claimed in claim 20, which comprises maintaining said opacity sensors essentially deposit free by flowing a stream of nitrogen across the face of said sensors.

28. The method as claimed in claim 20, which comprises maintaining said opacity sensors essentially deposit free by maintaining a negative pressure on the region of said sensors.

29. The method as claimed in claim 20, which comprises including the first step of preheating the refractory-lined cylindrical reactor vessel by means of a removable burner.